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AUTHOR	White, Marilyn Domas; Abels, Eileen G.; Nitecki, Danuta
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ABSTRACT

This project tested the appropriateness of SERVQUAL (i.e., an instrument widely used in the service industry for assessing service quality based on repeated service encounters rather than a particular service encounter) to measure service quality in special libraries and developed a modified version for special libraries. SERVQUAL is based on an approach which views service quality as the gap between clients' perceptions of performance and expectations. This study was concerned with the match between the five underlying service dimensions in SERVQUAL (tangibles, reliability, responsiveness, assurance, and empathy) and values clients mention in connection with library services. Initial data-gathering consisted of interviews with focus groups in two special libraries. Results showed considerable commonality between the service qualities considered important by library clients and those in SERVQUAL but noted some specific library-related behavior that indicated these aspects. After incorporating the latter into SERVQUAL, feedback was obtained on the preliminary version of the modified instrument in a half-day interactive session with 15 librarians from a range of special libraries. The questionnaire was modified slightly, based on the librarians' input, then tested with clients in two special libraries. Tests indicated its validity and internal consistency across the dimensions but did not show the same five dimensions as the developers of SERVQUAL had discovered. The modified SERVQUAL, SLA (Special Libraries Association) version is appended. (Contains 64 references.) (Author/MES)

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Abstract

This is the final report of a project funded by the Special Libraries Association which tested the appropriateness of SERVQUAL to measure service quality in special libraries and developed a modified version for special libraries. SERVQUAL is an instrument widely used in the service industry for assessing service quality, i.e. judgments about service based on repeated service encounters rather than a particular service encounter. It is based on the perceptions minus expectations (P-E) approach which views service quality as the gap between clients' perceptions of performance and expectations. The authors were concerned about the match between the five underlying service dimensions in SERVQUAL (tangibles, reliability, responsiveness, assurance, and empathy) and values clients mention in connection with library services. In the initial data-gathering, which addressed this question, the authors conducted interviews with focus groups of special library users in two special libraries. Results showed considerable commonality between the service qualities considered important by library clients and those in SERVQUAL but noted some specific library-related behavior that indicated these aspects. After incorporating the latter into SERVQUAL, they obtained feedback on the preliminary version of the modified instrument in a half-day interactive session with 15 librarians from a broad range of special libraries. The questionnaire was modified slightly, based on the librarians' input, and then tested with clients in two special libraries.

The Modified SERVQUAL, SLA Version, developed in this project is included in the report. The questionnaire calls for 7-point Likert scale assessments on 26 statements regarding service, first for expectations, then for perceptions. It also contains a question which asks respondents to allocate 100 points across statements characterizing the five underlying dimensions: tangibles, reliability, responsiveness, assurance, and empathy. This questionnaire differs from SERVQUAL in that four questions were added and wording for three questions were modified significantly. In addition to these relatively important changes, the wording was revised, as done in many studies using SERVQUAL, to reflect a library setting. Actual tests of the instrument indicated its validity and internal consistency across the dimensions but did not show the same five dimensions as the developers of SERVQUAL had discovered. The latter finding is common in other studies using SERVQUAL in business settings. Special library clients and clients of various types of business services were amazingly similar in rating the importance of the dimensions between library clients and clients of various types of business services, prioritizing in order: reliability, responsiveness, assurance, empathy, and tangibles.

Table of Contents

INTRODUCTION 1
Characteristics of Services 2
Definitions of Service Quality 2
Objectives of the Project 3

PHASE I. LITERATURE REVIEW 3
Measuring Service Quality: Performance-Minus-Expectations Approach . . 3
Measuring Service Quality: Performance-Based Approach 5
Applicability of Service Marketing Scales to Special Libraries 6

PHASE II. ADAPTING THE INSTRUMENT 7
Methodology 8
Literature Reviews 8
Client Focus Group Sessions 9
Librarians' Session 10
Results 11
Values 11
Items 17
Rating Technique 19

PHASE III: VALIDATING THE INSTRUMENT 20
Description of the Tested Instrument 20
Methodology and Sample 20
Initial Data Analysis 22
Item Scores 24
Reliability 25
Validity 25
Dimensionality 25
Relative Importance of Dimensions 31
Predictive or Concurrent Validity 31

SUMMARY AND COMMENTS 33

DISSEMINATION OF RESULTS 34

REFERENCES 35

APPENDICES 42
Appendix A. *Measuring Service Quality in Special Libraries* (Slides used in presentation, Special Libraries Association Conference, Atlanta, GA, June 13, 1994.) 42
Appendix B. Modified SERVQUAL, SLA Version (Version tested in Phase III) 48
Cover letter 53
Followup letter 54
Appendix C. Librarians' Session 55
Agenda 56
Participants 57
Appendix D. Modified SERVQUAL, SLA Version (Final Version) 59
Appendix E. Methods of Computing Summary Scores 64

List of Tables

Table 1. Values/Dimensions in Other Studies Modifying SERVQUAL, p. 12

Table 2. Attributes and/or Values Identified in Library Studies, p. 14

Table 3. New Items in Modified SERVQUAL, SLA Version, All Versions, p. 20

Table 4. Response Rate for Participating Organizations, p. 21

Table 5. Means and Standard Deviations for Expectation and Perception Items, p. 23

Table 6. Reliability of Both Versions of SERVQUAL in Different Organizational Settings, p. 26

Table 7. Factor Loading Matrices Following Oblique Rotation of Five-Factor Solutions for Difference Scores, p. 27

Table 8. Factor Loading Matrices Following Oblique Rotation of Five-Factor Solutions for Expectation and Perception Scores, p. 29

Table 9. Relative Importance of Instrument Dimensions, p. 32

Table 10. Regression Analysis of Overall Quality vs. Difference Scores and Weighted Difference Scores for the Five Dimensions, p. 33

Measuring Customer Satisfaction and Quality of Service in Special Libraries

INTRODUCTION

The diverse avenues to information that are rapidly emerging challenge the role and very survival of special libraries. Information-seekers who once turned to their corporate or agency library for help may now be prompted to use electronic or commercial document delivery services, to purchase individualized access rights in the form of database subscriptions or of purchased books, or to accept abbreviated abstracts instead of retrieving full-text articles. Not only are libraries competing for customers within this changing information delivery marketplace, they are re-examining their management, their manner of justifying budget, and their very existence.

To compete effectively and survive, special libraries may profit by using the managerial and marketing tools and approaches developed in business, such as total quality management (TQM).[1] TQM emphasizes providing quality services as perceived from the customer's point of view, not management's. Heavily used in Japan, TQM has been adopted in manufacturing and service industries in the United States over the last twenty years. Quality considerations have long been a concern of information professionals, but TQM has not been widely applied in libraries.[2]

A major stumbling block to implementing TQM in special libraries is the lack of an adequate, transferable instrument for assessing service quality from a customer's point of view. Lyon has issued a call for standardized instruments oriented to specialized reference services.[3] Most questionnaires are developed for a specific study with no attempts to devise a more generic instrument. It is especially important that such an instrument provide adequate feedback to allow libraries to determine the criteria that library users value about information services. Specific feedback allows libraries to modify services to meet the customers' criteria. Developing an instrument is costly and perhaps unnecessary if instruments already exist which are appropriate for, or can be adapted for, special libraries.

As service organizations, specialized libraries and information centers can benefit from models and techniques developed and widely used in service industries. Research in a range of service industries has pointed to numerous common factors characterizing all types of service industries. The instrument finally suggested in the project may provide a basis for comparing special library performance with those of other service industries and will help individual libraries to implement TQM and thus become more competitive.

Characteristics of Services

Services differ from goods in several ways that make judging service quality difficult. A good is a tangible object. A service is a performance or an act and thus intangible. Within product lines, goods have great consistency and are often produced to meet certain standards or guidelines. Dependent on the interaction between client and service provider, services, even of the same type, are subject to greater variation than goods. For goods, production is separate from consumption. The customer is present only at the final stage. With services, the production and consumption stages are often inseparable. As a result, the client is often present throughout the service encounter. Services, then, are characterized by *intangibility, heterogeneity, and inseparability of production and consumption.*[4]

Information services are perhaps among the most difficult to measure in terms of both customer satisfaction and service quality because of the perceptual overlap between information as a commodity and information as a process. Whitehall, for example, says his literature review is "about the quality of a service, not just the quality of information."[5] In the course of performing services, providers in many service sectors often generate a tangible output. An accountant, for example, audits a firm's books and presents the results in a report. An information specialist searches a computerized database and generates a bibliography for a client. In the information-related literature, the values assigned to the product are often confounded with the values assigned to the service.[6]

Definitions of Service Quality

Service quality is a judgment about the ability of a service to fulfill its task. Orr defined quality as "how good is the service?"[7] In some cases, the definition is an operational one designed to facilitate continued research. Parasuraman, Zeithmal, and Berry refer to it as "a form of attitude, related but not equivalent to satisfaction, [which] ... results from a comparison of expectations with perceptions of performance."[8]

The reference to "satisfaction" in the latter definition is important. The relationship between customer satisfaction and service quality is an ongoing question in service marketing.[9] Researchers agree, however, that customer satisfaction refers to a judgment made about a specific transaction. Service quality, on the other hand, is a more generalized, enduring judgment based in part on previous encounters which themselves resulted in satisfaction judgments.[10] It would be possible for a client to have an occasional unsatisfactory encounter with an organization he continues to rate high on service quality. This transaction/long-term judgment distinction is not always clear in the library literature.[11]

Objectives of the Project

This project was designed to remedy the lack of a standard instrument to measure service quality in special libraries. The objectives of this project, as stated in the proposal, are:

1. To identify existing models from the marketing and business literature that explain customer satisfaction, criteria by which customers measure/define quality of services, and data-gathering instruments for measuring customer satisfaction and service quality.

2. To develop a taxonomy of customer criteria of quality for services from the business and marketing literature and to identify values attached to information services by both library clients and library staff. In connection with this, to compare and contrast the values and perceptions of service quality held by library clients with those of service providers.

3. To develop a data-gathering instrument which can be used to derive customer satisfaction measures about information services.

4. In connection with this, to validate the instrument on a selected sample of 3 to 5 special libraries.

Note that the original third objective has been translated into third and fourth objectives here.

The first objective was addressed in Phase I; the second and third in Phase II; and the third in Phase III. The report follows this approach and discusses the tasks, methodology, and findings related to each section within the appropriate section.

PHASE I. LITERATURE REVIEW

Two approaches to measuring service quality have evolved in service marketing over the last ten to fifteen years. The dominant one, referred to as the P-E approach, views service quality as the gap between expectations (E) and performance (P). Critics have raised several questions about this approach, however, and measures based on performance alone have developed recently. Each approach will be addressed along with an instrument that has been developed for use with it.

Measuring Service Quality: Performance-Minus-Expectations Approach

A significant development influencing the study of service quality and the acceptance of the P-E approach is the "gaps model" formulated by Parasuram,

Zeithaml, and Berry in 1985.[12] This model is grounded in disconfirmation theory, which is also a prevalent approach to studying customer satisfaction.[13] Disconfirmation theory as applied in service quality posits that, before using a service, a client has certain expectations about it. After the service encounter, he compares those expectations with actual performance and his perception is either confirmed (if they match), negatively disconfirmed (if the perception is lower than the expectation), or positively disconfirmed (if the perception is higher than expectations). The essence of the theory is a comparison between expectations and performance.

The gaps model focuses on several service gaps that affect service quality: between customers' and management's perception of service expectations (Gap 1); between management's perception of customers' expectations and service-quality specifications (Gap 2); between service-quality specifications and actual service delivery (Gap 3); and between actual service delivery and what is communicated to customers about it (Gap 4). The quality gap (Gap 5) can be closed by reducing the four internal gaps found within the management of a service organization.[14] In measuring service quality and applying this model, however, the emphasis has been on the "expected service-perceived service gap" (P-E).

In 1988, to test the gaps model, Parasuraman, Zeithaml, and Berry devised the SERVQUAL instrument for measuring service quality. They revised it slightly in 1991. Since the gaps model was derived from studies in several different service industries, the authors intentionally designed a "generic instrument with good reliability and validity and broad applicability."[15] They envisioned the instrument being used across different types of service institutions, modified slightly as needed. It has become the most widely used instrument for measuring service quality in settings such as banks,[16] car service shops,[17] CPA firms,[18] dry cleaning firms,[19] educational institutions,[20] hospitals,[21] hotels and restaurants,[22] pest control firms,[23] public recreation programs,[24] and travel agencies.[25] No other instrument for measuring service quality has been tested as stringently and comprehensively as SERVQUAL.

In SERVQUAL the client responds to the same 22 questions twice: first, to establish his expectations of the ideal service; then, to note his perceptions of the actual service provided by a particular firm. Each response is scored on a 7-point Likert scale. Difference scores are computed by subtracting the score for expectations from the perceptions, so scores can range from -6 to +6. The higher the score, the higher the perception of quality.

The 22 items elicit information about service quality along five dimensions:

Tangibles: The appearance of physical facilities, equipment, personnel, and communication materials.

Reliability:	The ability to perform the promised service dependably and accurately.
Responsiveness:	The willingness to help customers and to provide prompt service.
Assurance:	The knowledge and courtesy of employees and their ability to convey trust and confidence.
Empathy:	The provision of caring, individualized attention to customers.[26]

SERVQUAL is often used in conjunction with other questions which assess overall service quality or evidence of subsequent action, *e.g.* recommending the service to a friend, willingness to use the service again.

Several criticisms have arisen about the SERVQUAL scale as a result of its widespread use and close scrutiny by other researchers. Some are more important than others, and most have been rebutted or addressed in subsequent articles by Parasuraman and his colleagues.[27] The criticisms have focused on: the scale's theoretical base,[28] the comparison norms for "expectations,"[29] the number and generic nature of the dimensions,[30] the instrument's length,[31] the ease of administration and analysis of data,[32] the need to use both perceptions and expectations data,[33] the validity of difference scores as data,[34] and the basis for inferring that higher scores always indicate higher quality.[35]

In numerous studies, the researchers have reworded items, substituted or inserted new items, and removed items from the scale to make it more appropriate for the service industry being studied.[36] Such modifications are not considered criticisms of SERVQUAL since this kind of use was anticipated and suggested by the original developers. As Parasuraman and his collaborators note, however, criticisms and findings questioning the number and nature of the dimensions may arise from modifying the scale so much that its integrity is undermined.[37]

Researchers have rarely disputed the validity of the individual 22 items or statements used in the revised scale, considering them well-supported by the scale development and revision procedures and through use in subsequent studies. As a result, the actual SERVQUAL items serve as the basis for other instruments.

Measuring Service Quality: Performance-Based Approach

Several of the criticisms of SERVQUAL can be remedied without rejecting the perception of service quality as a gap between performance and expectations or the P-E approach. Brown and others, for example, tested an alternative to difference scores.[38] Addressing definitional problems with the term "expectations," Parasuraman and his cohorts have since clarified expectations as "normative."[39] Word changes in the 1991

revision establish that orientation more clearly.

But other criticisms of SERVQUAL are interrelated and originate in its definition of service quality as a performance/expectations gap. Once this theoretical approach is accepted, and assuming the validity of the dimensions, the instrument must measure both expectations and performance through a range of items, resulting in a long instrument. Various researchers have discovered that performance scores alone have a greater predictive value for overall assessments of service quality and thus question the need for both measures.[40] As a result, within the last few years, several authors have developed measures based on performance alone.

The movement to a performance-based measure is not strictly a pragmatic response to difficulties with the SERVQUAL instrument. Proponents of the performance-based methods contend that attitude theory, especially the "adequacy-importance" model, is more appropriate than the gaps model and disconfirmation theory if the intent is to predict actual behavior or behavioral intent. This theory better explains relationships between service quality, customer satisfaction, and purchase or use intentions.[41]

SERVPERF is an instrument used to generate a performance-based measure of service quality. It was developed by Cronin in 1992 in a study of four service sectors (banking, pest-control, dry cleaning, and fast food).[42] Operationally, SERVPERF in its final form omits the expectation items section of SERVQUAL.[43] SERVPERF consists of the 22 items questioning customers' perceptions of service, worded exactly as in SERVQUAL. It may include questions to assess the importance of the items dimensions and several questions about overall service quality, satisfaction, and purchase intention.[44] As in SERVQUAL, the questions can be modified and additional items included. SERVPERF is shorter and does not require the use difference scores for analysis.

A literature review indicates no use of SERVPERF by other researchers. Its relatively recent appearance may mean that such use simply has not been reported.

Applicability of Service Marketing Scales to Special Libraries

Libraries and information services can benefit significantly by stressing their commonalities rather than their differences with other segments of the service industry.[45] The services marketing research is conceptually and methodogically rich. In addition, by moving to that framework, library administrators will be adopting a perspective that is more prevalent within many of their parent institutions.

Aside from these general factors, several others were considered in determining the potential appropriateness of service quality instruments in the service marketing area to special libraries:

1. The complexity of the instrument.
2. The ease of administration and analysis of results.
3. Its orientation to overall performance quality or to quality of specific services.
4. Its usefulness for predicting overall variance.
5. Its usefulness for providing diagnostic information.
6. Its usefulness for providing a basis for comparisons across a range of types of libraries and other service organizations.

Of the two instruments described in this paper, SERVPERF is less complex, is shorter, is easier to administer, and is better in predicting overall variance. SERVQUAL, on the other hand, is attractive because it is more comprehensive. It provides better diagnostic information, and, if desired, the performance data alone can be used to explain overall variance. Because it has been used more widely, SERVQUAL also allows for greater comparability with other service organizations.

Both instruments are oriented to overall performance quality, not to the quality of specific services; they are generic instruments. Both draw on the same items, whose wording would have to be modified slightly to fit library settings.

The dimensions covered by both are the same and seem appropriate for libraries. One medical library study of online services has already accepted the SERVQUAL dimensions.[46] In a related study, Danuta Nitecki is testing the applicability of SERVQUAL to several services in an academic library.[47] It seems reasonable to base the project instrument on one of these two. Their strengths outweigh their deficiencies, and the rigor with which at least SERVQUAL has been developed can be matched only with considerable effort. Both are flexible instruments and can be adapted as necessary for special libraries.

Based on these assessments, the decision was made to modify one of these two existing instruments rather than to develop an entirely new questionnaire. After the literature review, two important questions remain. One is the extent to which the dimensions covered by SERVPERF and SERVQUAL adequately reflect the range of values library clients attach to information services. If they do not, some items and dimensions may have to be added. The other is the rating technique to be used.

PHASE II. ADAPTING THE INSTRUMENT

SERVQUAL and SERVPERF differ only in their rating technique, not in the content of the items. For convenience, when discussing content in this paper, reference is made to SERVQUAL since it was the original instrument; comments about its content apply equally to SERVPERF.

In Phase II, the emphasis was on modifying the content of SERVQUAL to serve

the purposes of special libraries, if necessary. A critical task at this stage was determining if the five focal dimensions in SERVQUAL were appropriate for special libraries or if they should be modified or expanded. These dimensions have been developed and tested in research in a wide range of other service organizations but never in special libraries. In addition, the objective of this phase also entailed modifying each item for special libraries as necessary and determining the rating technique.

The significant results of this phase were presented at the SLA Conference in June, 1994. See Appendix A for copies of the slides used in this presentation.

The process followed during this phase was iterative and involved data-gathering in several steps:

Focus group session with library clients
Literature survey of library evaluation studies
Literature survey of SERVQUAL as modified by other researchers
Modification of instrument

Librarian session (including pretest of modified instrument)
Modification of instrument

Focus group session with another set of library clients
Assessment of instrument

Methodology

Literature Reviews

Two bodies of literature were reviewed to support the analysis of the appropriateness of the dimensional structure of SERVQUAL: library evaluation studies and studies using a modification of SERVQUAL in other service organizations. For a SERVQUAL study to be relevant, the modifications had to be dimensionally-related or involve significant reformulation of the individual items. In addition, only studies including the actual modified instrument, either in part or in entirety, or including substantive discussions of these modifications were useful.

The relevant library literature is more difficult to uncover because of the confusion in terminology, as referred to in the Introduction segment, and the lack of a coherent theoretical framework. The overlap between service and product often creates difficulty for interpreting the findings. In a review article, Whitehall summarizes the confusion found in the literature relating to quality: "Quality is something felt by the users of a service, but it is also a property of the service itself."[48] Furthermore, quality is often related to relevance[49] and actually refers to the information itself. As a

result, it was necessary to look broadly at library studies relating to quality, user satisfaction, effectiveness, evaluation and measurement.[50]

The questions guiding the analyses of the literature in both cases were the following:

1. What attributes or values have been uncovered or studied?
2. How important are they, based on the studies?
3. Which of these relate to service, not product?
4. Which attributes or values are important to special libraries?
5. Are these already covered by SERVQUAL?
6. If not, should they be?
7. If they are, do they suggest reformulating the items for greater pertinency?

One researcher analyzed the library service literature, another the business literature, to answer the first question. Answers to the remaining questions were determined in a group session so that they represented the collective decision of the three researchers.

Client Focus Group Sessions

Focus group sessions were held with two groups of clients in two separate organizations. A third group session, although planned, was not held after the second provided no new findings. In a science consulting firm, the clients were professional researchers on environmental issues with a wide variety of subject backgrounds. In a publishing firm, the clients were experienced writers generally specializing in one subject area or type of article. These sessions were held on-site and lasted approximately one hour. Participants were selected by the library directors, who arranged each session. No member of the library staff was present in either session to allow for frank discussions.

In the first session, the three group moderators served in three different roles: facilitator/moderator, public recorder, and observer/recorder. In the second session, two moderators served in two different roles: facilitator/moderator, public recorder/moderator. The sessions were recorded; in addition, the public and private notes were available for corroborative purposes.

The objective of these sessions was to elicit what clients value in the library services. Five questions served as the focus for discussion:

1. What is a quality library?
2. What factors are important in evaluating quality service?
3. Can you give an example of what makes you satisfied with service in a special library?

4. Can you give an example of what makes you dissatisfied with service in a special library?
5. How would you prioritize the elements you have identified?

After each discussion, the data from the various sources were combined and synthesized. No transcripts were made of the tape-recordings since note-taking could be done adequately from the recording itself, especially with the supplementary notes from several individuals.

Librarians' Session

A half-day session was held with 15 special librarians from Washington, DC, area on May 26, 1994 (See Appendix C for the agenda and participants.) They were selected to insure adequate representation of types and sizes of libraries. Several steps were taken to insure good attendance at this session: librarians were selected and invited through faxed invitations approximately four weeks before the meeting with a followup phone call to elicit a response several days later; librarians who declined were replaced in the sample with a similar letter/phone-followup until a total of 20 acceptances were received. About 10 days before the session, confirming letters were mailed with parking permits, maps, and a list of attendees. Despite this, five librarians failed to attend, usually with last-minute excuses.

The session was held in the AT & T Teaching Theater at the University of Maryland using the computer software *VisionQuest*. These sessions generally involve a moderator/facilitator and a computer facilitator. Together the two plan the session and translate it into the computer software. During the actual session, one person, generally the subject specialist, serves as a vocal moderator; the other operates the computerized software. The AT & T Theater representative was Dr. Theo Stone, Director.

The questions which guided the session, together with the software feature used in that task, are as follows:

1. How essential do you think it is for a special library to possess each of the following features? [The features corresponded to 28 perception items being considered at that point, and included the 22 SERVQUAL items.] (*VisionQuest*: Rating Scales)
2. How important are the following values to your clients when they evaluate special library services? [The values are the summary statements included in the feature importance question (See Appendix B, third section.)] (*VisionQuest*: Point Allocation)
3. Place each of the statements into one of the five service values. (*VisionQuest*: Compactor)

4. What other values are important to clients in evaluating the quality of services in special libraries? (*VisionQuest*: Group Brainwriting)
5. Can this list of values be subsumed into our existing values? (*VisionQuest*: Group Compactor)

The librarians became enthusiastic about the computer-moderated environment after a slow start. The early tasks were important ones in introducing them to the instrument but were not necessarily tasks that showed the real benefits of a computer mediated system. Feedback was fairly immediate so that the group's collective decision was available. They were necessary, however, to orient the librarians to the nature of the instrument, and served that purpose well. After the second task, for example, they immediately saw the average allocations per dimension for the entire group. The third phase served the purpose of seeing if the librarians recognized the relationship between item and service values. It addressed discriminant validity and the dimensionality of the scale and is analogous to the factor analysis done in Phase III with the test data. The fourth task was open-ended with everyone typing in suggestions. Individual suggestions were entered immediately into a collective databank and appeared on a large screen without attribution. They could react immediately, and the synergy was obvious. The final phase involved verbal discussion, led by the moderator, to categorize the values and to isolate those that were additions to values already suggested by the literature reviews. The computer facilitator moved items around, deleted them, so that a more coherent structure began to emerge. The session was, in the opinion of Dr. Stone, an optimal way to use the theatre.

Because the information was input to the computer, summary data were immediately available to the researchers in machine-readable form. The statistics are not very sophisticated, however, and one drawback for research purposes is that the data are not also available in disaggregated form to allow for subsequent manipulations.

Results

Values

Only six articles matched the criteria for the business literature, but they yielded a total of 208 questionnaire items.[51] These items were invaluable in indicating the flexibility of other researchers in tailoring SERVQUAL for their unique situations. They played a significant role in validating the more substantive rewording which occurred for a few original SERVQUAL items. Table 1 shows the dimensions represented.

Items represent more explicit and operational statements of the dimensions and were more useful. The studies showed nine apparently new dimensions (Table 1). The original qualitative development research for SERVQUAL had identified ten

Table 1. Values/Dimensions in Other Studies Modifying SERVQUAL

Value/Dimension	Author	Setting
Access	Carman	Dental school clinic; business school placement center; tire store; hospital Accounting firm
	Higgins and Ferguson	
Assurance	Baker and Lamb	Architecture firm
	Bojanic	Accounting services
	Freeman and Dart	Accounting firm
Communication	Higgins and Ferguson	Accounting firm
Competency	Higgins and Ferguson	Accounting firm
Courtesy	Carman	Dental school clinic; business school placement center; tire store; hospital Accounting firm
	Higgins and Ferguson	
Credibility	Higgins and Ferguson	Accounting firm
Empathy	Baker and Lamb	Architecture firm
	Boulding	Business school
Professionalism	Freeman and Dart	Accounting firm
Reliability	Baker and Lamb	Architecture firm
	Bojanic	
	Boulding	Business school
Responsiveness	Baker and Lamb	Architecture firm
	Bojanic	Accounting services
	Higgins and Ferguson	Accounting firm
Security	Higgins and Ferguson	Accounting firm
Tangibles	Baker and Lamb	Architecture firm
	Bojanic	Accounting services
	Freeman and Dart	Accounting firm
	Higgins and Ferguson	Accounting firm
Timeliness	Freeman and Dart	Accounting firm
Understanding the customer	Higgins and Ferguson	Accounting firm

Note: Refer to Endnote 51 for identification of the studies mentioned in the table.

dimensions, which collapsed, through factor analysis, into the five actually included in the instrument.[52] Many of the supposedly new dimensions found in this literature:

communication, competence, courtesy, credibility, security, and understanding the customer, correspond to those earlier dimensions; they are now represented by items within a SERVQUAL dimension. Courtesy, for example, is included in the Assurance dimension, and "understanding the customer" is included in the Empathy dimension. The one value not already covered in SERVQUAL that seemed potentially useful for libraries was the dimension of "access."

One flaw that surfaced through analysis of the business literature was that some items asked clients to make judgments they could not make, for example, about management.

Most of the library-related articles concern only one service or information product: an online search service or a document delivery service. D'Elia and Walsh's multi-faced analysis of services in five public libraries is an exception.[53] It includes: quality and availability of collections; physical facilities; library staff and convenience of hours.

Table 2 summarizes the values apparent in the library-related studies. Sometimes these dimensions were derived from questionnaire items. The table excludes attributes specific to one service or found only in one service and those related to information itself, such as timeliness and relevance. It groups similar attributes or, in some cases, attributes related to a specific aspect of a library, *e.g.* the collection.

Attributes considered most applicable for consideration in the revision of SERVQUAL were those appearing in studies of different services. For example, accuracy was discussed in terms of information centers[54], information systems[55], document delivery[56], reference services[57] and an information bulletin.[58] To overcome the lack of conformity of terms, specific attributes were grouped into categories. For example, "accessibility" covered: need to schedule appointments, library hours, distance to library. Many of these attributes are included in SERVQUAL's dimensions, especially when the comparison is made to individual items expressing the dimensions. Timeliness and speed and response time are incorporated into SERVQUAL's reliability, for example. Again, "access" seemed to be the attribute which should at least be considered in modifying SERVQUAL.

The first client session was especially useful. What became apparent during the discussion was that many of the factors clients mentioned were already included in SERVQUAL. Also, to some extent, the order in which qualities occurred in the discussion reflected the weightings seen later in the test situations. Accuracy and timeliness -- both important elements in SERVQUAL's responsiveness and reliability sections -- were mentioned often and early. Clients valued order in a library and the willingness of the librarian to respond to their individual needs. Two factors they mentioned which were subsequently considered in writing items were ease of use and access.

Table 2. Attributes and/or Values Identified in Library Studies

Attributes	Authors	Setting
Timeliness	Dalton	Reference service
	Griffiths and King	Information centers
	Whitehall	Information bulletin
Speed/Response Time	Line	Document delivery
	Lyon	Online search
	Whitehall	Information bulletin
	Line	Document delivery
	Taylor	Information systems
	Lancaster	Document delivery
	Childers *et al*	Public libraries
	Maizell	Technical libraries
	Cronin	Database search
	Cronin	Interlibrary loan
Relevance	Hilchey and Hurych	Online reference
	Whitehall	Information bulletin
	King Research	Public libraries
	Lancaster	Literature search
	Childers *et al*	Public libraries
Accessibility		
Need to schedule	D'Elia and Walch	Public Library
	Tessier *et al*	Computer search
Hours	Tessier *et al*	Computerized search
	Griffiths and King	Information centers
	Budd and DiCarlo	Academic libraries
Distance to library	Moore	Public libraries
Availability of books	DeProspo *et al*	Public libraries
Accuracy	Griffiths and King	Information centers
	Taylor	Information systems
	Line	Document delivery
	Dalton	Reference services
	Whitehall	Information bulletin
Quantity		
Number of items	Griffiths and King	Information center
Comprehensiveness	Taylor	Information systems
Completeness	Griffiths and King	Collection
Range of sources	Line	Document delivery
Coverage	Whitehall	Information bulletin
Flexibility	Line	Document delivery
Adaptability	Taylor	Information system

Table 2 (Continued)

Attributes	Authors	Setting
Amount of User Effort	Lancaster	Literature search
	Taylor	Information systems
	Whitehall	Information bulletin
Ease of Use	Whitehall	Information bulletin
	Taylor	Information systems
	Line	Document delivery
Physical Facility		
Noisiness	Budd and DiCarlo	Academic libraries
	D'Elia and Walch	Public libraries
Neatness	Budd and DiCarlo	Academic libraries
	D'Elia and Walch	Public libraries
Seating: Sufficiency	Budd and DiCarlo	Academic libraries
	D'Elia and Walch	Public libraries
Seating: Variety	Budd and DiCarlo	Academic libraries
Lighting	Budd and DiCarlo	Academic libraries
Temperature	Budd and DiCarlo	Academic libraries
Staff		
Friendliness	Dalton	Reference services
	Budd and DiCarlo	Academic libraries
	D'Elia and Walch	Public libraries
Courtesy	Dalton	Reference services
	Budd and DiCarlo	Academic libraries
Knowledgeability	Lancaster	Subject search
Subject specialist	Dalton	Reference services
Skill	Dalton	Reference services
Willingness to help	Budd and DiCarlo	Academic libraries
	Lancaster	Subject search
Availability	Dalton	Reference services
	Lancaster	Subject search
	D'Elia and Walch	Public libraries
	DeProspo *et al*	Public libraries
Availability by phone	Budd and DiCarlo	Academic libraries
Competency	D'Elia and Walch	Public libraries
Complaint responsiveness	Budd and DiCarlo	Academic libraries
Request form	Lyon	Online search services
Approachability	Lancaster	Subject search
Output	Tessier *et al*	Computerized search
	Lancaster	Literature search
	Hilchey and Hurych	Online reference services
Format and arrangement	Whitehall	Information bulletin
Type and content	Whitehall	Information bulletin

Table 2 (Continued)

Attributes	Authors	Setting
Equipment		
Pay Copy Machine	Budd and DiCarlo	Academic libraries
Collection		
Availability	D'Elia and Walch	Public libraries
Quality	Budd and DiCarlo	Academic libraries
Newspapers	Budd and DiCarlo	Academic libraries
Journals	Budd and DiCarlo	Academic libraries
	Dalton	Reference services
General books	Budd and DiCarlo	Academic libraries
Reference collection	Budd and DiCarlo	Academic libraries
	Dalton	Reference services
Research collection	Dalton	Reference services
Interlibrary loan	Budd and DiCarlo	Academic libraries
Scope	Griffiths and King	Information centers
Catalog		
Ease of use/arrrangement	Budd and DiCarlo	Academic libraries
Shelf arrangement	Budd and DiCarlo	Academic libraries
Service policies		
Loans	Budd and DiCarlo	Academic libraries
	Lancaster	Document delivery
Reasonable fines	Budd and DiCarlo	Academic libraries
Governing policies	Tessier *et al*	Computerized search

Note: Sometimes study variables could not be translated easily into attributes so they are expressed in the terminology of the study. Refer to Endnote 50 for identification of the studies mentioned in the table.

The second client session was held after the librarians' session. The clients were from a totally different type of institution and faced regular, but frequent deadlines. Almost immediately they, too, emphasized response time and reponsiveness to unique needs. For the most part, however, they reiterated many of the same variables already identified through the other two sessions.

In both cases, the respondents were articulate, thoughtful information-users but had relatively limited experience with special libraries outside of their immediate environment. They responded well to the open questions, had some difficulty with the critical incident questions, and were able to reach a consensus on prioritizing the factors they had identified fairly easily.

In the librarians' session, the librarians first took the pretest instrument. The intent was not only to test the instrument, but also to establish a basis for subsequent discussions. On the whole, the librarians took more time to adjust to thinking freely about how clients value information services than the clients themselves did. The librarians seemed to approach the session with a preconceived notion of the instrument as a traditional user survey. This manifested itself in their suggestions about additions to the instrument. Many of their inappropriate items dealt with soliciting user input about about options among services. They also had some difficulty with the notion of "values or dimensions" of services. As a result, their comments were not always on target.

One important issue some raised, however, is the extent to which paying or not paying for a service affects expectations and perhaps perceptions of performance. Several were in organizations which "charged back." At least one of the business studies had included several items about pricing, but the questions seemed out of place.[59] The researchers carefully considered this issue. Incorporating it as it should be in the instrument would significantly affect the length of the instrument and the time to complete it, resulting in potentially lower response rates. Also, it would introduce an element which is not consistently appropriate across libraries. One solution, however, which may be addressed later, is to include a few questions about the effects of price as options for libraries. These would not be included in the Expectations/Performance sections.

Items

The modifications to SERVQUAL entailed both major and minor rewording of existing items and adding new items. SERVQUAL is intended to have minor adjustments every time it is used since it refers to the type of organization in each item in the Expectations section and the specific organization in the Perceptions section. The first modification entailed making these minimal but necessary adjustments.

Then, each item was scrutinized to assess the relevance of the item as worded for special libraries. This task entailed identifying the objective of each question, noting how it translated into a statement, and then evaluating its appropriateness for library services. Neither the development or refinement articles by Parasuraman, Berry, and Zeithaml nor the critical articles by other researchers present the specific objectives of each question, aside from dimension. These had to be inferred from the dimension and wording. In most cases, the objective was obvious; for others the objectives were vague or seemed to duplicate those of other questions.

For several items, the objective was considered useful, but the wording was inappropriate, ambiguous, or simply vague. Revision of these items are considered major rewording, but the intent of the original SERVQUAL item was still maintained, at least in part. Major rewording occurred for three items as follows:

SQ: Excellent telephone companies will provide their services at the time they promise to do so.

SLA: Excellent special libraries will provide services during stated hours.

SQ: Materials associated with the service (such as pamphlets or statements) will be visually appealing in an excellent telephone company.

SLA: In excellent special libraries, materials associated with services will be clearly written and visually appealing.

SQ: Customers of excellent telephone companies will feel safe in their transactions.

SLA: Clients of excellent special libraries will feel their transactions will be held confidential.

Six items were added to the instrument in the first modification and pretested with the librarians at their session. These reflected values which had been discussed in the first focus group session, found in library-related studies, or additional items representing existing SERVQUAL values. They include the following:

E23. The facilities of excellent special libraries will be well-organized.

E24. In excellent special libraries, the staff will be responsive to the individual information needs of their clients.

E25. In an excellent special library, clients will always be able to contact an appropriate person.

E26. Excellent special libraries will provide access to the information the client needs.

E27. The facilities of excellent special libraries will be easily accessible to all their clients.

E28. Information provided by excellent special libraries will be easily accessible to their clients.

Several of these addressed the value of "access to information," identified both in the focus group session and in the library studies. E25 is analogous to an item in Higgins and Ferguson emphasizing the ready availability of an "appropriate" person.

The librarians were the first to pretest the actual instrument. They responded to the questions in terms of how they anticipated their clients would respond, not according to their own expectations and perceptions. The pretest was followed by discussion of the individual items and suggestions of other elements to be considered for inclusion. Of particular concern was the problem of including the term "access" which can refer ambiguously to both physical and intellectual access. After the librarians' session, additional minor rewording took place, sometimes simply to vary sentence structure to maintain the respondent's attention.

After assessing the librarians' comments and re-analyzing the original items, several were eliminated since the original SERVQUAL items could be interpreted to include the new item. Sometimes the problem was that the new item was usually phrased ambiguously but could not be clarified without becoming overly specific or wordy or using jargon. Throughout the rewording and adding of items, the researchers had to walk a fine line between making an item library-appropriate and having an item become service-specific. Service-specific items essentially specified the quality of one service, instead of a mix of services. Since the objective was to develop an instrument that could be used across various types of special libraries in which the mix of services may vary, questions which could be interpreted as service-specific were avoided.

Table 3 shows the items included in the penultimate version of the instrument, which was tested with actual clients during Phase III. (See Appendix B for the tested instrument.) Of the six included in the librarians' version of the instrument, three were retained intact (See the first three in Table 3). Access, covered in E26-E28 on the librarians' version, was refined to refer only to physical access (See Empathy item). E26 was considered to be covered through other items already.

No revisions were made to the individual items after the second focus group session. The group's comments served more to validate decisions than to suggest new items or values, although the formats of the two groups were similar.

Rating Technique

The choice of rating technique was based indirectly on discussions in the Librarians' Session and was greatly influenced by the diagnostic feature associated with difference scores. The librarians reacted very well to the structural approach of stating expectations and then assessing performance. This approach provides some indication of the elements of library services the clients consider most important. As a result, the decision was made to retain the Performance-Expectations approach found in the original SERVQUAL. The benefits seem to outweigh the drawbacks.

Table 3. New Items in Modified SERVQUAL, SLA Version, All Versions

Dimension	Item
Tangibles	The facilities of excellent special libraries will be well-organized.
	In excellent special libraries, clients will always be able to contact an appropriate person.
Responsiveness	Excellent special libraries will provide access to the information the client needs.
Empathy	In excellent special libraries, physical access to the services will be convenient for all clients.

Note: Items are phrased as they exist in the Expectations section.

PHASE III: VALIDATING THE INSTRUMENT

Description of the Tested Instrument

The instrument tested in the final phase consists of four sections: Expectations, Perceptions, Feature Importance Question, and Personal Information, in that order. (See Appendix B.) The Expectations and Perceptions sections contain the same 26 statements, asking for judgments based on a 7-point Likert scale. In this test, the respondents were also given the option to indicate "no basis for judgment" for each item in the Perceptions scale. For Expectations, the statements are phrased in terms of "an excellent special library" and expressed in future tense; for Perceptions, the statements are expressed in particularized terms, using the name of the library, and in present tense. The first 22 items correspond to the 22 items in the SERVQUAL instrument; the last four items are totally new items developed after the focus group sessions with user groups in two special libraries and the librarians' session. Within each section, the items relating to a particular dimension are grouped, but not labeled. As noted, the last four items were not integrated into the dimension groups for these tests. In the final version, the items are incorporated into the relevant sections and the opportunity for no basis for judgment is excluded in the Perceptions section. (See Appendix D.) This version of the instrument will be used in another special library in September.

Methodology and Sample

The questionnaire was tested in two special libraries. One is affiliated with a professional science association; the other is in an association representing a particular age group. Both are large organizations with many library clients. They have professional staffs of 5 to 9 members; budgets ranging from $400,000 to approximate

Table 4. Response Rate for Participating Organizations

Library	Total Distributed	Initial Receipts	Followup Receipts	Blank Responses	Total Usable Receipts
Library 1	149 * (100%)	61 (41%)	28 (19%)	5 (3%)	84 (56%)
Library 2	148 ** (100%)	56 (38%)	5 (3%)	3 (2%)	58 (39%)

* One recipient called to indicate that she was not a library client and should not have been included in the original sample.

** Several duplicates were noted in the sample after it was distributed and have been removed for calculating the response rate.

$1.5 million; collections of 10,000 to 25,000 volumes, and 350 to 700 current subscriptions.[60] The questionnaire will be tested at a smaller library in a manufacturing firm headquarters in September before writing the SLA publication about the instrument. The librarian there indicated that, because of staff vacations throughout the organization, testing the questionnaire in August was inadvisable.

In both settings, the libraries supplied a list of recent library clients. Generally, they were selected on the basis of a quota sample of clients over one to two months. A random sample of 150 participants was selected from each group.

Questionnaires were distributed via internal mail with an initial deadline of one week after distribution. A followup, including a second copy of the questionnaire, was distributed 1-2 days after the deadline to all non-respondents. Sealed responses were returned to the library.

The adjusted response rates (See Table 4, column: Total usable receipts) for both organizations are disappointing, considering that the questionnaire requires only 15 to 20 minutes to complete. Returning the questionnaire was also simplified. (Note: Respondents simply had to fold and staple the completed questionnaire and return via internal mail.) Several factors may explain the low rate. At Library 1, the organization began its annual national conference, which was held in Washington, DC, a few days after the final suggested response date. Although this situation insured staff availability, the pressure of conference-related activities may have diminished the normal response rate. The high rate of vacations in August at Library 2 may have affected the response rate. Several late respondents indicated they had been away. On the other hand, many studies using the instrument including are based on much lower response rates, 17 to 25 percent, for example.[61] Sample sizes for these studies were usually larger.

The combined sample was about 70 percent female, 30 percent male. About 18 percent were frequent clients of library services, using the library at least once a day to several times a week. About 35 percent indicated they used it once a week to several times a month; and about 45 percent indicated that they used it about once a month to several times a year. The samples did not differ significantly on either of these characteristics, although slightly more clients at the science library were infrequent users.[62]

Initial Data Analysis

The questionnaire items from the test version are grouped into the following dimensions for data analysis:

Tangibles	5 items	Items 1-4, 23
Reliability	5 items	Items 5-9
Responsiveness	6 items	Items 10-13, 24, 25
Assurance	4 items	Items 14-17
Empathy	6 items	Items 18-22, 26

The analysis uses at times various summary scores as data for more advanced statistical analyses. These are identified below. See Appendix E for the computation methods for SERVQUAL scores. Reference is made in the text to the relevant portions of the SERVQUAL guidelines. Obvious computation methods are not noted, *e.g.* means for a data item across cases. The summary statistics would also be used operationally to provide feedback to the original libraries. The major statistics are based on difference scores, computed as P (performance) - E (expectations). Each expectation score is subtracted from its counterpart performance score. A negative difference score indicates that expectations exceed performance; a positive difference score, that performance surpasses expectations.

Per item:

- Mean score per item
- Mean difference score per item

Per dimension: (Each score is based on the number of items per dimension, which varied across the dimensions.):

- Expectation Dimension Score (Mean expectation score)[63] (Appendix E, Section 1A)
- Perception Dimension Score (Mean perception score) (Appendix E, Section 1A)
- Dimension Difference Score (Mean difference score) (Appendix E, Section 1)

- Weighted Dimension Difference Score (Weighted difference score (Appendix E, Section 2)

Table 5. Means and Standard Deviations for Items in Expectations and Perceptions Sections

	Expectations		Perceptions		
Variable	Mean	Std. Dev.	Mean	Std. Dev.	N of cases
Tangibles					
E1.	6.18	1.05	5.40	1.11	120
E2.	4.77	1.53	5.21	1.58	137
E3.	4.68	1.57	5.93	1.07	135
E4.	6.01	1.09	5.17	1.40	125
E23. *	6.55	.83	5.67	1.22	130
Reliability					
E5.	6.58	.73	5.80	1.29	127
E6.	6.39	.87	5.98	1.12	129
E7.	6.19	.85	5.83	1.01	127
E8.	6.55	.80	6.45	.81	131
E9.	6.35	.98	5.72	1.26	97
Responsiveness					
E10.	5.94	1.04	5.36	1.44	111
E11.	6.32	.84	5.79	1.21	131
E12.	6.51	.79	5.96	1.14	132
E13.	5.77	1.21	5.52	1.20	130
E24. *	6.07	1.06	5.22	1.40	129
E25. *	6.51	.76	5.80	1.15	131
Assurance					
E14.	6.11	1.04	5.71	1.30	135
E15.	5.53	1.6	5.85	1.24	75
E16.	6.26	.87	5.82	1.31	134
E17.	6.03	.91	5.67	1.16	126
Empathy					
E18.	5.89	.95	6.09	.98	133
E19.	5.60	1.24	5.88	1.18	114
E20.	5.77	1.00	6.03	1.04	131
E21.	5.98	1.09	5.99	1.20	116
E22.	5.82	1.11	5.58	1.18	125
E26. *	6.02	1.27	5.64	1.29	102

Notes: Numbers in the variable column correspond to items in the instrument in Appendix B. The number of cases for Perceptions items is 142, except for E23, which has 141 cases.

* New item

In addition, a composite score per library can be generated (Appendix E, Section 3). This summary score is not used in this analysis but would be included in any diagnostic reports written for a library and in any study comparing results across libraries.

Validation of the instrument follows an approach similar to that used by Parasuraman, Zeithaml, and Berry in the refinement of SERVQUAL.[64] This entails looking at several factors:

1. The nature of the scores and clients' agreement about them
2. The implications of the "unable to judge" responses
3. Reliability, *i.e.* the internal consistency among items for each dimension
4. The validity of the items, including the dimensionality and the ability of the dimension difference scores to predict a general measure of quality
5. The relative importance of the dimensions to the clients

In general, the analysis does not provide library-specific information unless it is appropriate for validation of the instrument and usually only when it does not reveal service quality judgments in a specific library. Individual reports giving actual judgments will be given to each participating library.

Item Scores

The means for over half of the items on the Perceptions section were over 6 on the 7-point scale (Table 5). The questionnaire is designed to measure the normative expectations, *i.e.* the expectations clients *would* have of an *excellent* special library, so the high scores are not surprising. This perspective differs from a prescriptive one in which respondents are asked to indicate what an excellent special library *should* have. None of the items are expressed using the word "should." The respondents placed less emphasis on the apppearance of physical facilities and employees, the ready availability of a staff member, and the confidentiality of their query, although the latter two are still somewhat important.

The high expectations for so many items make it difficult for any but truly excellent libraries to score positively in the difference scores, which are based on both performance and expectations. Difference scores mask the level and emphasize discrepancies between performance and expectations. Any interpretation of the data in an operational setting should consider not only the difference scores, but also the mean perception and expectation score on each item and on each dimension.

The standard deviations reflect the extent of agreement on the score. For almost half of the items, there was considerable agreement on the scores; most of these were rated highly. They included all of the reliability items, three of the six responsiveness items, and two of the items added in the modification. Two tangibles items contained in the original SERVQUAL showed the least unanimity in responses. Responses ranged from 1 or 2 to 7 for 20 items; from 3 to 7 in the remaining 6,

reflecting major differences across clients.

The number of items with 10 percent or more "no basis to judge" responses (fewer than 128 responses in the last column) is disturbing. It may reflect the high rates of infrequent library users in each sample. Those choosing this option may also be a genuinely unfamiliar with the element being considered, unwilling to draw conclusions based on null feedback in some situations, *e.g.* judgments about the accuracy of a library's records based on no use-related problems, or prefer to express an opinion only after considerable experience. Other studies have not alluded to large numbers of nonresponses. In the next test situation and in the final version of the instrument, respondents will not be allowed this option. It may be that, faced with a forced choice situation, respondents will respond. Not choosing among the alternatives and leaving the item blank is always an option in that situation. Although the nature of the judgments is somewhat different, in the Expectations section, where clients had to leave an item blank if they did not wish to make a judgment, only one did so and then only for one item.

Reliability

Reliability coefficients (Cronbach's alphas) were computed for dimensions in two versions of SERVQUAL: the modified SERVQUAL (SLA) and the original SERVQUAL (excluding added items), for the combined group (Table 6). These indicate the internal consistency among items within each dimension. The alphas for both versions are lower than for SERVQUAL as tested in several other organizations. For other organizations, these ranged from .80 to .93. In libraries the scores ranged from .66 to .84. In the three dimensions where items had been added--for Tangibles and Responsiveness, alphas for the SLA version were slightly higher; for Empathy, the original SERVQUAL items showed slightly greater consistency. The differences between the two library-related versions were minimal.

Validity

In assessing validity, the analysis addresses two concerns: discriminant validity or the dimensionality of the instrument, *i.e.* the extent to which the instrument has five dimensions, and the predictive validity, *i.e.* the extent to which judgments on the dimensions predict overall assessments of quality. Factor analysis was used to assess dimensionality; regression analysis to assess predictive validity.

Dimensionality

One criticism of SERVQUAL addressed in validating the instrument is the consistency of the five underlying dimensions. The dimensions were identified in the original study supporting the scale's development and predicated as being constant across service organizations. Parasuraman, Berry, and Zeithaml themselves found a tendency for six dimensions in the research supporting the refinement of the scale.[65]

Table 6. Reliability of Both Versions of SERVQUAL in Different Organizational Settings

	Library		Other Service Organizations **				
Dimension	SLA*	SQ*	1	2	3	4	5
Tangibles	.75	.72	.83	.80	.84	.85	.86
Reliability	.66	.66	.88	.92	.92	.92	.88
Responsiveness	.84	.81	.91	.92	.93	.92	.88
Assurance	.81	.81	.89	.87	.91	.90	.87
Empathy	.71	.74	.87	.85	.89	.88	.87

* SLA indicates the Modified SERVQUAL, SLA Version; SQ refers to the Modified SERVQUAL, SLA Version, excluding the new items, i.e. the first 22 items.

** Company 1 is a telephone company; companies 2 and 3, insurance companies; companies 4 and 5, banks. Data are from Parasuraman, Zeithaml, and Berry, 1991.

Other researchers have found fewer dimensions.[66] To validate the dimensions in this study, factor analyses were run on the difference scores, the expectation scores, and the perception scores. Because SERVQUAL was considered to have a five-dimensional structure, the analysis was constrained to five factors, using an oblique rotation. An oblique rotation assumes realistically some multicollinearity among the variables. Table 7 shows the rotated factor loading matrices for the difference scores for the combined sample.

Convergent validity addresses the issue of how well the questionnaire items representing a concept actually "converge" on the construct. If the factor-loading patterns for the modified SERVQUAL are similar to those of the original SERVQUAL, then the instrument has convergent validity. The factor structure of the difference scores in the modified SERVQUAL does not readily match the factor structure hypothesized to underly SERVQUAL (Table 7). The tightest correspondence is for Tangibles. There is some overlap between reliability and assurance, and between responsiveness and empathy. A factor analysis done on item difference scores, excluding the new items, *i.e.*, the original SERVQUAL, accounted for more of the variance (79.1%). Without constraint this analysis established a five-factor solution, but the items did not load on the same factors as in either the development or refinement research by Parasuraman, Zeithaml, and Berry.

To some extent, reliability as reported in Table 6 is an indirect measure of convergent validity since it reflects the cohesiveness among the scale items. Although the alphas for this test are lower than other tests of SERVQUAL, the alphas of the 26-

Table 7. Factor Loading Matrices Following Oblique Rotation of Five-Factor Solutions for Difference Scores *

	Factor Loadings				
Items **	F1	F2	F3	F4	F5
Tangibles					
DS1	65				
DS2	65				
DS3		39	39	44	
DS4	73				
DS23	81				
Reliability					
DS5		91			
DS6		62			
DS7				39	
DS8				83	
DS9				50	
Responsiveness					
DS10		84			
DS11		75			
DS12			53		
DS13			64		
DS24					59
DS25			61		
Assurance					
DS14		47	43		
DS15				86	
DS16				53	
DS17			59		

Table 7 (Continued)

	Factor Loadings				
Items **	F1	F2	F3	F4	F5
Empathy					
DS18			78		
DS19					88
DS20			72		
DS21				61	
DS22		52	46		
DS26	48				

* All numbers in the table are magnitudes of factor loadings multiplied by 100. Loadings of .35 are not shown. The percentage of variance explained by the five factors is 66.6%.
** DS numbers correspond to the item numbers in the instrument in Appendix B.

item modified SERVQUAL are comparable to those of the 22-item modified SERVQUAL and some are reasonably high. The factor analysis provides a better measure, however.

Table 8 shows the factor loadings for the perceptions and expectations scores for the combined sample. Again the factor structure does not match the five dimensions supposedly underlying underlying SERVQUAL. Based on a criterion of eigenvalues of one or more, a six-factor solution would better explain Expectations, increasing the percentage of variance accounted for to 64%; and, for Perceptions, a 13-factor solution would explain 95% of the variance. In the latter case, however, the first factor would explain about 50% of the variance, and some factors are represented by only one item. As the data show, only half of the items loaded on the same factors for both groups. These results raise the question of the constancy of the underlying dimensions in the scale and are consistent with findings of several other studies using modified SERVQUAL. The number of factors found in studies using the original SERVQUAL varies from two[67] to eight.[68]

Although this finding is troubling, the researchers withhold judgment about discriminant validity, *i.e.* the extent to which the modified SERVQUAL has five dimensions, for several reasons. First, the samples may be atypical. The dimensions may be appropriate over many samples or over larger samples. Many of the other

Table 8. Factor Loading Matrices Following Oblique Rotation of Five-Factor Solutions for Expectations and Perceptions *

	Factor Loadings									
	Expectations					Perceptions				
Items **	F1	F2	F3	F4	F5	F1	F2	F3	F4	F5
Tangibles										
1	46					73				
2	78								73	
3	80								53	
4	50					80				
23					84	72				
Reliability										
5		80					92			
6		66					73			
7		54					75			
8		58								60
9					47			56		
Responsiveness										
10		62					96			
11		75					86			
12		66						78		
13		58						52		
24				51				70		
25		41						63		
Assurance										
14		47	58					78		
15			71						73	
16			46					63		
17				54				83		

Table 8 (Continued)

	Factor Loadings									
	Expectations					Perceptions				
Items **	F1	F2	F3	F4	F5	F1	F2	F3	F4	F5
Empathy										
18				88				64		
19					55					80
20				83				73		
21				49					47	
22		52			61			62		
26	48				56				48	

* All numbers in the table are magnitudes of factor loadings multiplied by 100. Loadings of .35 are not shown. The percentage of variance explained by the five factors is 59.9 for Expectations and 78.5 for Perceptions.

** Item numbers correspond to the item numbers in the instrument in Appendix B.

studies supporting SERVQUAL have been in large organizations with thousands of customers. The client is relatively anonymous and does not necessarily identify with the service-giver. In addition, they usually pay for the service and, as a result, may be more demanding. In the special libraries in this test, the client and library are part of the same organization, and the client does not pay for the service.[69] As a result, library clients may not be as critical in their evaluation of service and may tend to score items high.

Another reason is that, in this test, respondents were allowed to indicate "no basis for judgment" for the Perceptions items. While useful for one purpose, this option means that difference scores cannot be computed for items in which the respondent selected this alternative. The dimension difference scores in this test accommodated missing data but the scores then are not complete (See section, Initial Data Analysis). In the next test, respondents will not be allowed this option. Data will thus be more complete, allowing a more reliable testing of the underlying dimension structure. In the Expectations section, which has the most complete data, the overlap between Responsiveness and Reliability is obvious, but the Tangibles, Assurance, and Empathy dimensions have some support. The combined Responsiveness and Reliability dimension accounts for 35% of the variance by itself. The final factor in this case draws items from three dimensions.

Finally, the results may simply be due to the fact that, even though the respondents recognize the distinctiveness of the dimensions (See following section,

Relative Importance of Dimensions), the ratings may be similar across dimensions, in which case fewer factors would be apparent in factor analysis; alternatively, if ratings are sufficiently dissimilar within a dimension, more factors may occur. As Parasuraman, Berry, and Zeithaml point out,

> In other words, differences in the number of empirically derived factors across replications may be primarily due to across-dimension similarities and/or within-dimension differences in customers' evaluations of a *specific* company involved in each setting. At a *general* level, the five-dimensional structure of SERVQUAL may still serve as a meaningful conceptual framework for summarizing the criteria customers use in assessing service quality.[70]

The instrument has been tested in only two libraries with very similar results. The maximum number of responses considered in any of the three factor analyses is only 142, far fewer than the number used in the development and refinement of the original scale. Additional testing needs to take place with the Modified SERVQUAL, SLA Version, with its unadjusted Likert scale.

Relative Importance of Dimensions

In section three of the test instrument, clients were asked to allocate 100 points across summary statements describing the five dimensions. In the instrument, the dimensions themselves are never described by one word. The summary statements are stated more generically than the individual items, whereas, in the Perceptions section, the client is assessing the importance of some manifestations of these dimensions. In section three, the client can assign weights after comparing one value with another. These weights are subsequently used to compute weighted dimension scores.

From the scores it is readily apparent that the respondents did distinguish among the dimensions as expressed in these statements.

An underlying premise in using SERVQUAL as the basis for the SLA instrument is that libraries can be regarded as service organizations, possessing the traits of many other service organizations which, at a cursory analysis, may seem to be significantly different. The relative importance that library clients assign to the dimensions covered by SERVQUAL is very similar to those from other types of service organizations (Table 9). "All companies," in this case, refers to the several insurance companies, a telephone company, and two banks in the SERVQUAL refinement study. The only noteworthy differences are that library clients seem to place more emphasis on reliability and less on empathy.[71]

Predictive or Concurrent Validity

In a second test of validity, the extent to which the dimension scores predicted the rating of overall service quality was evaluated. The dimension difference scores,

Table 9. Relative Importance of Instrument Dimensions

Dimension	Combined	Library 1	Library 2	All Cos.*
Tangibles	12	13	11	11
Reliability	34	33	36	32
Responsiveness	23	24	22	23
Assurance	18	18	18	19
Empathy	13	13	12	17

* All companies represents the aggregated results of research done in five organizations (insurance companies, banks, and a telephone company) during the refinement of SERVQUAL in 1991. Parasuraman, Zeithaml, and Berry, 1991.

both unweighted and weighted, were regressed on overall service quality rated on a 10-point scale. (See the fourth section of the instrument).

The adjusted R^2 scores show that the dimensions can predict some degree of variance in overall quality (.37 for dimension difference scores, .42 for weighted dimension scores). Clearly there are other factors involved in the clients' judgments about the general level of service in the libraries. The weighted dimension difference scores explained slightly greater variance than the dimension difference scores, but neither explained as much as the original SERVQUAL had in previous studies (.57 to .71 across five companies). In the analysis of dimension difference scores, the empathy and reliability scores were not significant. There was a high degree of multicollinearity among the dependent variables, making it difficult to interpret the regression coefficients. Empathy correlated with responsiveness; reliability with assurance and responsiveness; and assurance with responsiveness. In the analysis of weighted dimension scores, only the empathy dimension was not significant. Again there was a high degree of multicollinearity. Empathy and responsiveness correlated with assurance; and reliability with responsiveness. In both analyses, the strongest Beta scores are for responsiveness.

Both Babakus and Boller and Parasuraman, Zeithaml, and Berry have determined that perception scores alone usually correlate better with overall assessments of quality. Parasuraman, Zeithaml, and Berry for example, had R^2 values of .72 to .81 with perception scores alone and R^2 of .57 to .71 by using difference scores.[72] The same pattern was found in this study. In this study, a regression analysis using only perception scores generated an adjusted R^2 value of .75 in comparison with the .42 of the weighted dimension scores and the .37 of the dimension scores. Others have used these findings to question continued use of difference scores. The usefulness of the difference scores as diagnostic tools outweighs

Table 10. Regression Analysis of Overall Quality vs. Difference Scores for the Five Dimensions *

	Standard Regression Coefficient	
Independent Variable	Dimension Difference Score	Weighted Dimension Difference Score
Tangibles	.16 ****	.14 ****
Reliability	-.04	.19 ***
Responsiveness	.38 **	.34 *
Assurance	.23 ****	.22 ***
Empathy	.00	-.02
Adjusted R^2 value	.37	.42

Note: Dependent value is overall quality judgment based on 10-point scale.
* Significant at the .001 level.
** Significant at the .005 level.
*** Significant at the .025 level.
**** Significant at the .05 level.

their flaws in predicting quality assessments of this nature, but these findings do raise questions about the validity of the instrument. The merits and reliability of having clients rate service with a single number are questionable.

SUMMARY AND COMMENTS

This project undertook to develop an instrument that can be used in many types of special libraries to measure service quality. Both the Special Library Association and the researchers themselves consider such an instrument a necessary tool in influencing special librarians to implement total quality management or continual quality management in their libraries. As special libraries face competition from other information providers, adopting such techniques and responding quickly and effectively to meet client expectations will become increasingly important.

Although some of the results of the validation phase are disappointing, the findings are not unexpected. The initial literature survey was thorough and identified both the benefits and the flaws of SERVQUAL. The findings of the limited testing carried out in Phase III of this project reflect experiences similar to those of some other SERVQUAL users. SERVQUAL itself has been used numerous times in many different types of service organizations with a variety of experiences. It is administered regularly and frequently, and no other instrument has been developed as a useful

alternative. Derived from good qualitative research, it has been refined and tested using sound psychometric techniques.

So, despite some of the concerns raised in the initial tests during the third phase of this project, modifying this instrument remains a good decision. Easy to administer, easy to analyze, the Modified SERVQUAL, SLA Version provides good diagnostic data on what clients value in information services and on how they think their libraries are responding to their expectations. After Phase II and the modifications made to the instrument, including the new items, the researchers are reasonably sure that it reflects the range of values of library clients, as determined through interviews with the clients themselves and with experienced special librarians and through reviews of both library evaluation studies and SERVQUAL-related business literature. Some of the questions surfacing in Phase III can be addressed more fully after the instrument has been used in many other special libraries.[73]

An added benefit from the Modified SERVQUAL, SLA Version is that, with its use, special libraries clearly state that they view themselves as service organizations and that they see many similarities between what they do and what other service organizations do. This framework allows them to draw on literature and research findings that are theoretically and methodologically very rich.

DISSEMINATION OF RESULTS

The Modified SERVQUAL, SLA Version is potentially very useful for special libraries. As a result, the dissemination of the findings is very important. This technical report, which emphasizes, especially in the last two stages, validating the instrument, is not likely to "sell" the instrument to professional librarians. An article has already been written and submitted to *Special Libraries* based on Phase I.[74] It forms the basis for the Phase I section of this report. Some of the decisions from that stage and the findings of Phase II were presented at the Special Libraries Annual Conference in June. Evidence of interest is that copies of the slides from that presentation were distributed to about 50 special librarians who requested them. In addition, the research team has already been approached about the possibility of a followup presentation at the Montreal conference based on actual use of the instrument in several libraries. Several librarians are already considering using the instrument. A second article summarizing the validation of the instrument, will be submitted to *Special Libraries* by mid-October. The most important vehicle for encouraging and guiding use of this instrument will be, however, a practical manual of the use of the instrument. The Project Director has arranged with Tobi Brimsek of the Special Libraries Association to prepare a practical manual on use of the instrument to be published by the end of 1994.

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43. SERVPERF is described here as it would be for subsequent studies. To test their argument, the authors actually used SERVQUAL, supplemented by questions to measure the importance of the SERVQUAL items and single-item scales to measure overall service quality, customer satisfaction, and purchase intentions. *Ibid.*

44. The importance weight questions were adapted from a similar section in the 1988 version of SERVQUAL, dropped in the 1991 version.

45. To those who see little similarity between information centers and dry cleaners or car service shops, we point out that the service industry itself is not monolithic. Numerous typologies of services have been devised to see similarities and differences across sectors of the service industry. Based on Lovelock's typology of services, specialized libraries and information centers offer intangible services directed at people's minds. They often have a membership relationship with their clients and usually provide services in discrete transactions. The services themselves are highly customized, and staff exercise considerable judgment in meeting individual needs. The extent of demand probably fluctuates only narrowly over time, and, in most cases, peak demand can usually be met without major delay. The nature of the interaction between the client and special library differ: sometimes the client comes to the library; sometimes the library delivers services to the customer. Services are delivered in person but also through electronic communications or mail. Services may be provided at a single site or at multiple sites. This analysis is based on the classification scheme suggested in Lovelock.

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59. Baker and Lamb.

60. *American Library Directory* (Dialog File 460).

61. Parasuraman, Zeithaml, and Berry, 1991, p. 421.

62. These comments are based on Chi Square analyses of both sex and use by library. Although not included in the report, an analysis was done to determine if men and women rated services differently; no statistically significant variation occurred in these samples, either for the individual library samples or for the combined sample. No analysis was done by library use, although this will be done at a later date.

63. Mean dimension expectation and perception scores have not been used in this analysis but will be used in the individual reports to the participating libraries.

64. Parasuraman, Zeithaml, and Berry, 1991.

65. Parasuraman, Zeithaml, and Berry, 1988, pp. 424-431.

66. Babakus and Boller, for example, found only two dimensions. Babakus and Boller.

67. *Ibid.*

68. Carman.

69. As the librarians pointed out during their session, in some libraries, staff does pay indirectly for library services, especially services with high external costs, such as online searching, through "charge-backs" to a department's budget. Awareness of this may affect their judgments. This raises an interesting research question: Are paying clients more critical and demanding than non-paying clients?

70. Parasuraman, Zeithaml, and Berry, 1991, p. 440.

71. An interesting question posed by this research is the extent to which librarians can accurately assess the value structure of their clients. This ability would play a critical role in developing new services. In the pretest, the librarians had similar perceptions of the priorities of library clients. The mean points per dimension are as follows: Tangibles 9, Reliability 36, Responsiveness 23, Assurance 18, and Empathy 15. Each librarian responded in terms of the clients of his/her own library. The librarians, of course, represented many libraries, not simply the two in this study, but the degree of similarity is obvious.

72. Babakus and Boller; Parasuraman, Zeithaml, and Berry, 1991, p. 441.

73. About two-thirds of the librarians at the librarians' session volunteered their libraries as test sites, and several attendees at the SLA conference are interested in using it in their libraries. In addition to actually using in several other libraries, the research team will make every effort to obtain data for secondary analysis from its use by others.

74. White, Marilyn Domas and Eileen G. Abels. "Measuring Service Quality in Special Libraries: Lessons from Service Marketing." *Special Libraries* (Forthcoming).

Appendix A. *Measuring Service Quality in Special Libraries* (Slides used in presentation, Special Libraries Association Conference, Atlanta, GA, June 13, 1994.)

Measuring Service Quality in Special Libraries

Marilyn Domas White, Associate Professor
College of Library and Information Services

Eileen G. Abels, Assistant Professor
College of Library and Information Services

Dennis A. Nitecki, Associate Director for Public Services
UMCP Libraries

University of Maryland at College Park

Order of Presentation

- Introduction and literature review
- The SERVQUAL instrument
- Adaptation of SERVQUAL for special libraries
- Future steps
- Questions and discussion

Project Objectives

- Identify models and instruments related to service quality in marketing and business literature
- Develop a taxonomy of values associated with information services
- Develop a data-gathering instrument for measuring service quality in special libraries
- Validate the instrument in several special libraries

Service Characteristics

- Intangibility
- Inseparability of production and consumption
- Heterogeneity
- Perishability

Service Quality Models

- Library literature
- Satisfaction literature
- Service marketing literature

Gaps Model of Service Quality

- Not knowing what customers expect
- The wrong service-quality standards
- The service performance gap
- When promises do not match delivery
- Difference between customers' expectations and perceptions of service

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Selection Criteria

- Complexity of the instrument
- Ease of administration and analysis of results
- Orientation to overall performance quality
- Usefulness for predicting overall judgments of quality
- Usefulness for providing diagnostic information
- Usefulness for comparisons across types of libraries and other service organizations

SERVQUAL Dimensions

TANGIBLES
Appearance of physical facilities, equipment, personnel, and communication materials.

RELIABILITY
Ability to perform promised service dependably and accurately.

RESPONSIVENESS
The willingness to help clients and provide prompt service.

SERVQUAL Dimensions

ASSURANCE
The knowledge and courtesy of employees and their ability to convey trust and confidence.

EMPATHY
The caring, individualized attention provided to clients.

SERVQUAL: Structure

Expectations:	What service qualities should an excellent organization have?
Performance:	What service qualities does this organization have?
Priorities:	How does the client prioritize the five major categories of qualities?

Demographics, if desired

SERVQUAL: Expectations/ Performance Sections

- 22 items repeated for each section, slightly reworded. Total of 44 items.
- 7-point Likert scale, anchored at ends: Strongly agree or disagree.
- Scored by subtracting expectations score from performance score (P-E).

Sample Item for Reliability

E? Excellent special libraries will perform the service correctly the first time.

P? XYZ Special Library performs the service correctly the first time.

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SERVQUAL: Priorities Section

- 5 items: Definitions of 5 values
- Allocate 100 points across the values

Service Quality in Library Literature: Relationship to SERVQUAL

Accessibility	Empathy, ACCESSIBILITY, Responsiveness
Adaptability	Empathy
Availability	ACCESSIBILITY, Responsiveness
Collection	ACCESSIBILITY
Ease of use	Empathy
Equipment	Tangibles
Facilities	Tangibles
Service Policy	Responsiveness
Response Time	Reliability
Staff	Assurance, Responsiveness

Other Services' Adaptations to SERVQUAL

Meet budget requirements	Cost
Meet unique requests	Empathy
Faculty availability	Responsiveness
Creative office space	Tangibles

Focus Groups

- 6 special library clients
- 15 special librarians

Client Focus Group Questions

- What is a quality library?
- What factors are important in evaluating quality service?
- Can you give an example of what makes you satisfied with service in a special library?
- Can you give an example of what makes you dissatisfied with service in a special library?

What do special library clients consider important?

Variety of sources
Finding needed information
Good librarian
Timeliness of document delivery
User friendliness of library
Up-to-date information
Organization of library
Adaptability
Convenience
Attitude

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What do special librarians think their clients consider important?

Reliability	36 points
Responsiveness	23
Assurance	17
Empathy	15
Tangibles	9

How well do the 28 items define the dimensions?

18 items in same SERVQUAL dimension

10 items over 50% of participants categorized in another dimension

Sample Ambiguous Item

Employees of excellent special libraries will tell clients exactly when services will be performed. (Responsiveness)

What dimensions/items should be added to SERVQUAL for special libraries?

Literature:	Access; Ease of use
Clients:	Access; Ease of use; Organization
Service Providers:	Cost-benefit-effectiveness

Modifications to SERVQUAL

- Major and minor rewording
- Additional items
- Still pending: New dimensions

Changed Item: Tangibles

Materials associated with the service (such as pamphlets or statements) will be visually appealing in an excellent telephone company.

In excellent special libraries, materials associated with services will be clearly written and visually appealing.

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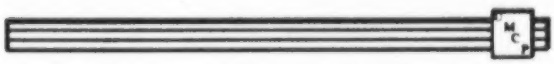
Changed Item: Assurance

Customers of excellent telephone companies will feel safe in their transactions.

Clients of excellent special libraries will feel their transactions are held confidential.



New Item: Tangibles

The facilities of excellent special libraries will be well-organized.

New Items: Responsiveness

In excellent special libraries, clients will always be able to contact an appropriate person.

Excellent special libraries will provide access to the information the client needs.

New Item: Empathy

In excellent special libraries, physical access to the services will be convenient for all clients.

Steps Remaining in Project

- Two additional focus groups of special library users
- Final modification of instrument
- Validation of instrument in several special libraries
- Preparation of final report

Future Objectives

- To encourage use of instrument in special libraries
- To compare measurements of service quality in special libraries with similar efforts in other types of libraries

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Appendix B. Modified SERVQUAL, *SLA Version (Version tested in Phase III)*
Cover letter
Followup letter

Modified SERVQUAL, SLA Version (Tested version)

EXPECTATIONS SECTION

Directions: Based on your experiences as a client in special libraries or information centers, please think about the kind of special library that would deliver excellent quality information service. Think about the kind of special library you would be pleased to use. Please show the extent to which you think such a special library would possess the feature described by each statement. If you think a feature is *not at all essential* for excellent special libraries such as the one you have in mind, circle the number "1"; if you consider it *absolutely essential* for excellent special libraries, circle "7". If your feelings are less strong, circle one of the numbers in the middle. There are no right or wrong answers--the number you assign should truly reflect your expectations about special libraries that would deliver an excellent quality of service.

		Not at all essential						Absolutely essential
E1.	Excellent special libraries will have modern equipment.	1	2	3	4	5	6	7
E2.	Physical facilities at excellent special libraries will be visually appealing.	1	2	3	4	5	6	7
E3.	Employees of excellent special libraries will be neat-appearing.	1	2	3	4	5	6	7
E4.	In excellent special libraries, materials associated with services will be clearly written and visually appealing.	1	2	3	4	5	6	7
E5.	When employees of excellent special libraries promise to do something by a certain time, they will do so.	1	2	3	4	5	6	7
E6.	When clients have a problem, excellent special libraries will show a sincere interest in it.	1	2	3	4	5	6	7
E7.	Excellent special libraries will perform the service correctly the first time.	1	2	3	4	5	6	7
E8.	Excellent special libraries will provide services during stated hours.	1	2	3	4	5	6	7
E9.	Excellent special libraries will maintain accurate records, e.g. circulation or catalog records.	1	2	3	4	5	6	7
E10.	Employees of excellent special libraries will tell clients exactly when services will be performed.	1	2	3	4	5	6	7
E11.	Employees of excellent special libraries will give prompt service to clients.	1	2	3	4	5	6	7
E12.	Employees of excellent special libraries will always be willing to help clients.	1	2	3	4	5	6	7
E13.	Employees of excellent special libraries will never be too busy to respond to client requests.	1	2	3	4	5	6	7
E14.	The behavior of employees of excellent special libraries will instill confidence in clients.	1	2	3	4	5	6	7
E15.	Clients of excellent special libraries will feel their transactions will be held confidential.	1	2	3	4	5	6	7
E16.	Employees of excellent special libraries will be consistently courteous with clients.	1	2	3	4	5	6	7

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		Not at all essential							Absolutely essential
E17.	Employees of excellent special libraries will have the knowledge to answer client questions.	1	2	3	4	5	6	7	
E18.	Excellent special libraries will give clients individual attention.	1	2	3	4	5	6	7	
E19.	Excellent special libraries will have operating hours convenient to all clients.	1	2	3	4	5	6	7	
E20.	In excellent special libraries employees will give clients personal attention.	1	2	3	4	5	6	7	
E21.	Excellent special libraries will have the clients' best interests at heart.	1	2	3	4	5	6	7	
E22.	The employees of excellent special libraries will understand the specific needs of their clients.	1	2	3	4	5	6	7	
E23.	The facilities of excellent special libraries will be well-organized.	1	2	3	4	5	6	7	
E24.	In excellent special libraries, clients will always be able to contact an appropriate person.	1	2	3	4	5	6	7	
E25.	Excellent special libraries will provide access to the information the client needs.	1	2	3	4	5	6	7	
E26.	In excellent special libraries, physical access to the services will be convenient for all clients.	1	2	3	4	5	6	7	

PERCEPTIONS SECTION

Directions: The following set of statements relate to your perceptions about the XYZ Library. For each statement, please show the extent to which you believe the XYZ Library has the feature described by the statement. Circling a "1" means that you strongly *disagree* that the XYZ Library has that feature, and circling a "7" means that you strongly *agree*. You may circle any of the numbers in the middle that show how strong your feelings are. There are no right or wrong answers -- all we are interested in is a number that best shows what you think about the XYZ Library service.

		Strongly disagree						Strongly agree	No basis to judge
P1.	The XYZ Library has modern equipment.	1	2	3	4	5	6	7	0
P2.	Physical facilities at the XYZ Library are visually appealing.	1	2	3	4	5	6	7	0
P3.	Employees of the XYZ Library are neat-appearing.	1	2	3	4	5	6	7	0
P4.	In the XYZ Library, materials associated with services are clearly written and visually appealing.	1	2	3	4	5	6	7	0
P5.	When employees of the XYZ Library promise to do something by a certain time, they do so.	1	2	3	4	5	6	7	0
P6.	When clients have a problem, the XYZ Library shows a sincere interest in it.	1	2	3	4	5	6	7	0
P7.	The XYZ Library performs the service correctly the first time.	1	2	3	4	5	6	7	0

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		Strongly disagree						Strongly agree	No basis to judge
P8.	The XYZ Library provides services during stated hours.	1	2	3	4	5	6	7	0
P9.	The XYZ Library maintains accurate records, e.g. circulation or catalog records.	1	2	3	4	5	6	7	0
P10.	Employees of the XYZ Library tell clients exactly when services will be performed.	1	2	3	4	5	6	7	0
P11.	Employees of the XYZ Library give prompt service to clients.	1	2	3	4	5	6	7	0
P12.	Employees of the XYZ Library are always willing to help clients.	1	2	3	4	5	6	7	0
P13.	Employees of the XYZ Library are never too busy to respond to client requests.	1	2	3	4	5	6	7	0
P14.	The behavior of employees of the XYZ Library instills confidence in clients.	1	2	3	4	5	6	7	0
P15.	Clients of the XYZ Library feel their transactions are held confidential.	1	2	3	4	5	6	7	0
P16.	Employees of the XYZ Library are consistently courteous with clients.	1	2	3	4	5	6	7	0
P17.	Employees of the XYZ Library have the knowledge to answer client questions.	1	2	3	4	5	6	7	0
P18.	The XYZ Library gives clients individual attention.	1	2	3	4	5	6	7	0
P19.	The XYZ Library has operating hours convenient to all clients.	1	2	3	4	5	6	7	0
P20.	In the XYZ Library employees give clients personal attention.	1	2	3	4	5	6	7	0
P21.	The XYZ Library has the clients' best interests at heart.	1	2	3	4	5	6	7	0
P22.	The employees of the XYZ Library understand the specific needs of their clients.	1	2	3	4	5	6	7	0
P23.	The facilities of the XYZ Library are well-organized.	1	2	3	4	5	6	7	0
P24.	In the XYZ Library, clients are always be able to contact an appropriate person.	1	2	3	4	5	6	7	0
P25.	The XYZ Library provides access to the information the client needs.	1	2	3	4	5	6	7	0
P26.	In the XYZ Library, physical access to the services will be convenient for all clients.	1	2	3	4	5	6	7	0

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FEATURE IMPORTANCE QUESTION

Directions: Listed below are five features pertaining to special libraries and the services they offer. Please allocate a total of 100 points among the five features according to how important you think each feature is. The more important you think a feature is, the more points you should allocate to it. **Please ensure that the points you allocate to the five features add up to a total of 100.**

Points	Features
_____ 1.	The appearance of the special library's physical facilities, equipment, personnel, and communications materials.
_____ 2.	The ability of the special library to perform the promised service dependably and accurately.
_____ 3.	The willingness of the special library to help clients and provide prompt service.
_____ 4.	The knowledge and courtesy of the special library's employees and their ability to convey trust and confidence.
_____ 5.	The caring, individualized attention the special library provides its clients.

PERSONAL INFORMATION

Directions: Now, a few questions about yourself and your overall perception of the library's services.

1. How frequently do you use the XYZ Library? (Check the one that best characterizes your use.)

_____ At least once a day	_____ Several times a month
_____ Several times a week	_____ About once a month
_____ About once a week	_____ Several times a year

2. Gender: _____ Female _____ Male

3. Overall, how do you rate the quality of the services at the XYZ Library? _____
(Rate from 1 to 10 with 10 as the highest quality.)

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UNIVERSITY OF MARYLAND AT COLLEGE PARK

COLLEGE OF LIBRARY AND INFORMATION SERVICES

August 1, 1994

Dear XYZ Library Client:

We are conducting a study to identify how library clients evaluate the quality of special library services. Will you please take 15 to 20 minutes to complete the enclosed questionnaire? You will provide us with valuable information for this project. Most of the questions deal with your general expectations about library services and your specific perceptions about the XYZ Library. Your librarian, [Name], has identified you as a client of XYZ Library services.

Special libraries, including your own XYZ Library, are always concerned about providing high quality services that satisfy the information needs of their clientele. To insure library responsiveness to client expectations, we are developing an instrument that can be used to measure the quality of service in many types of special libraries. The project is funded by the Special Libraries Association. In this phase of the project, we are testing the instrument in several special libraries in the Washington, DC, area. The XYZ Library is serving as one of the test sites.

The XYZ Library will directly benefit from your response. In addition to using your responses for the general project, we will provide a brief, individualized report to Ms. Matkovich. The report will cover what XYZ staff members value in library services and their perceptions of how well the XYZ Library is meeting those expectations. Your responses will be aggregated and you will not be identified by name. The number of the questionnaire is used solely to followup, if necessary, on non-responses.

Please complete the questionnaire as soon as possible, preferably by August 9. After you complete the questionnaire, simply staple it together so that the colored page with the address is on the outside and put it in the regular office mail. The library is collecting the questionnaires for us, but the staff will not see your individual responses.

Thank you for your help. If you have any questions, please call me at (301) 405-2047, or contact me via e-mail at whitemd@wam.umd.edu.

Sincerely,

Marilyn Domas White
Project Director

Enclosure

ROOM 4105, HORNBAKE LIBRARY BUILDING • COLLEGE PARK, MARYLAND 20742-4345 • (301) 405-2033

UNIVERSITY OF MARYLAND AT COLLEGE PARK

COLLEGE OF LIBRARY AND INFORMATION SERVICES

August 11, 1994

Dear XYZ Library Client,

By the time you've brewed yourself a cup of tea, you could have completed this questionnaire. We sent you another copy of the questionnaire last week but have not yet received your reply.

The questionnaire about service quality serves two purposes: first, it allows us to determine what XYZ staff members value in library services and how well they perceive the XYZ Library is meeting those expectations; second, it allows us to validate a service quality instrument that will eventually be used in many different kinds of special libraries.

We are very appreciative of the XYZ's permitting us to use its library as one of several test sites for this project funded by the Special Libraries Association. You are part of a sample of library users identified by the XYZ Library staff who are being asked to complete this questionnaire; your individual reply is very important since it helps to ensure reliable, valid data.

As we mentioned in our original letter, your responses will be aggregated and you will not be identified by name. The number of the questionnaire is used solely for monitoring responses. Please complete the questionnaire as soon as possible. After you complete the questionnaire, simply staple it together so that the colored page with the address is on the outside and put it in the regular office mail. The library is collecting the questionnaires for us, but the staff will not see your individual responses.

If you have any questions, please call me at (301) 405-2047, or via e-mail at whitemd@wam.umd.edu. Enjoy your cup of tea, and thank you for your help.

Sincerely,

Marilyn Domas White
Project Director

Enclosure

NOTE: A tea bag was included with this letter.

ROOM 4105, HORNBAKE LIBRARY BUILDING • COLLEGE PARK, MARYLAND 20742-4345 • (301) 405-2033

Appendix C. Librarians' Session
Agenda
Participants

MEASURING SERVICE QUALITY IN SPECIAL LIBRARIES
Librarians' Session
May 26, 1994

Agenda

8:30 Registration. Coffee/tea and rolls.

9:05 Introduction
Outline of Project
Purpose of Librarians' Session

9:20 *Special Library Service Quality Measuring Instrument*
[Participants complete questionnaire on paper and on computer.]

9:45 Values I:
What values are being measured in the instrument?
Do the actual items covered adequately measure these values?

.....

10:30 Coffee/Tea Break

.....

10:45 Values II:
Should other values be included?
If so, what items can be written to measure these values?

11:30 Summary
Future Steps in Project
Services Questionnaire
Permission Form

11:45 Leave for lunch

12:00 Buffet Lunch at Rossborough Inn Carriage House

MEASURING QUALITY OF SERVICE IN SPECIAL LIBRARIES
Librarians' Session
May 26, 1994

Ms. Rosalind P. Cheslock, Manager
Martin Marietta Laboratories Library
1450 S. Rolling Road
Baltimore, MD 21227-3898

Mr. Henry Courtney, Librarian
IBM Corporation, Systems Integrated Division
Information Resource Center
800 N. Frederick Avenue, mail drop 183-LC 118
Gaithersburg, MD 20879

Ms. Linda Dodson, Librarian
Booz Allen & Hamilton Library
8283 Greensboro Drive
McLean, VA 22102

Ms. Patricia Fagan, Director
Library, Arthur Andersen & Co.
1666 K Street, NW
Washington, DC 20006

Mr. Robert S. Gresehover, Librarian
Johns Hopkins U., Applied Physics Laboratory
R. E. Gibson Library
Johns Hopkins Road
Laurel, MD 20723

Ms. Maureen W. Matkovich, Manager of Library Services
American Chemical Society Library
1155 16th Street, NW, Room 502
Washington, DC 20036

Ms. Judith A. Nixon, Librarian
Tydings & Rosenberg, Law Library
100 E. Pratt St, 26th flr
Baltimore, MD 21202

Mr. Hugh O'Connor, Director
AARP Research Information Center
Building A, 2d floor, 601 E Street, NW
Washington, DC 20049

Ms. Edna Paulson, Librarian
American Petroleum Institute
1220 L Street, NW
Washington, DC 20005

Ms. Rhoda Ratner, Chief Librarian
National Museum of American History Branch Library
12th & Constitution Avenue, NW
Washington, DC 20560

Ms. Ann Robertson, Manager of Information
McKinsey & Co., Inc. Library
1101 Pennsylvania Avenue, NW, Suite 700
Washington, DC 20004

Mr. Leonard Samowitz, Chief of Reference
Federal Deposit Insurance Corp. Library
550 17th Street, NW
Washington, DC 20429

Ms. Roberta I. Shaffer, Director
Covington & Burling Law Library
1201 Pennsylvania Avenue, NW, 11th floor
Washington, DC 20004

Ms. Lynne Siemers, Librarian
Washington Hospital Center Medical Library
110 Irving Street, NW, Room 2A-21
Washington, DC 20010-2975

Mr. Fred Simms, Librarian
Washington Gas Corporate Library
6801 Industrial Road
Springfield, VA 22151

Ms. Kathleen Trimble, Director
U.S. News & World Report Library
2400 N Street, NW
Washington, DC 20037-1196

Ms. Pamela Van Hine, Head Librarian
American College of Obstetricians and Gynecologists
Resource Center
409 12th Street, SW
Washington, DC 20024

Ms. Benita W. Vassallo, Chief of Library Services
Inter-American Development Bank Library
1300 New York Avenue, NW
Washington, DC 20577

Ms. Joellen Vernali-Knoerl
AARP Research Information Center
Building A, 2d floor, 601 E Street, NW
Washington, DC 20049

Appendix D. Modified SERVQUAL, SLA Version (Final Version)

Modified SERVQUAL, SLA Version (Final version)

EXPECTATIONS SECTION

Directions: Based on your experiences as a client in special libraries or information centers, please think about the kind of special library that would deliver excellent quality information service. Think about the kind of special library you would be pleased to use. Please show the extent to which you think such a special library would possess the feature described by each statement. If you think a feature is *not at all essential* for excellent special libraries such as the one you have in mind, circle the number "1"; if you consider it *absolutely essential* for excellent special libraries, circle "7". If your feelings are less strong, circle one of the numbers in the middle. There are no right or wrong answers--the number you assign should truly reflect your expectations about special libraries that would deliver an excellent quality of service.

		Not at all essential						Absolutely essential
E1.	Excellent special libraries will have modern equipment.	1	2	3	4	5	6	7
E2.	Physical facilities at excellent special libraries will be visually appealing.	1	2	3	4	5	6	7
E3.	Employees of excellent special libraries will be neat-appearing.	1	2	3	4	5	6	7
E4.	In excellent special libraries, materials associated with services will be clearly written and visually appealing.	1	2	3	4	5	6	7
E5.	The facilities of excellent special libraries will be well-organized.	1	2	3	4	5	6	7
E6.	When employees of excellent special libraries promise to do something by a certain time, they will do so.	1	2	3	4	5	6	7
E7.	When clients have a problem, excellent special libraries will show a sincere interest in it.	1	2	3	4	5	6	7
E8.	Excellent special libraries will perform the service correctly the first time.	1	2	3	4	5	6	7
E9.	Excellent special libraries will provide services during stated hours.	1	2	3	4	5	6	7
E10.	Excellent special libraries will maintain accurate records, e.g. circulation or catalog records.	1	2	3	4	5	6	7
E11.	Employees of excellent special libraries will tell clients exactly when services will be performed.	1	2	3	4	5	6	7
E12.	Employees of excellent special libraries will give prompt service to clients.	1	2	3	4	5	6	7
E13.	Employees of excellent special libraries will always be willing to help clients.	1	2	3	4	5	6	7
E14.	Employees of excellent special libraries will never be too busy to respond to client requests.	1	2	3	4	5	6	7
E15.	In excellent special libraries, clients will always be able to contact an appropriate person.	1	2	3	4	5	6	7

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E16.	Excellent special libraries will provide access to the information the client needs.	1 2 3 4 5 6 7
E17.	The behavior of employees of excellent special libraries will instill confidence in clients.	1 2 3 4 5 6 7
E18.	Clients of excellent special libraries will feel their transactions will be held confidential.	1 2 3 4 5 6 7
E19.	Employees of excellent special libraries will be consistently courteous with clients.	1 2 3 4 5 6 7
E20.	Employees of excellent special libraries will have the knowledge to answer client questions.	1 2 3 4 5 6 7
E21.	Excellent special libraries will give clients individual attention.	1 2 3 4 5 6 7
E22.	Excellent special libraries will have operating hours convenient to all clients.	1 2 3 4 5 6 7
E23.	In excellent special libraries employees will give clients personal attention.	1 2 3 4 5 6 7
E24.	Excellent special libraries will have the clients' best interests at heart.	1 2 3 4 5 6 7
E25.	The employees of excellent special libraries will understand the specific needs of their clients.	1 2 3 4 5 6 7
E26.	In excellent special libraries, physical access to the services will be convenient for all clients.	1 2 3 4 5 6 7

OVERALL ASSESSMENT

1. Listed below are five features pertaining to special libraries and the services they offer. Please allocate a total of 100 points among the five features according to how important you think each feature is. The more important you think a feature is, the more points you should allocate to it. **Please ensure that the points you allocate to the five features add up to a total of 100.**

Points		Features
_____	1.	The appearance of the special library's physical facilities, equipment, personnel, and communications materials.
_____	2.	The ability of the special library to perform the promised service dependably and accurately.
_____	3.	The willingness of the special library to help clients and provide prompt service.
_____	4.	The knowledge and courtesy of the special library's employees and their ability to convey trust and confidence.
_____	5.	The caring, individualized attention the special library provides its clients.

2. Overall, how do you rate the quality of the services at the XYZ Library? _____
(Rate from 1 to 10 with 10 as the highest quality.)

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'ERCEPTIONS SECTION

Directions: The following set of statements relate to your perceptions about the XYZ Library. For each statement, please show the extent to which you believe the XYZ Library has the feature described by the statement. Circling a "1" means that you strongly *disagree* that the XYZ Library has that feature, and circling a "7" means that you strongly *agree*. You may circle any of the numbers in the middle that show how strong your feelings are. There are no right or wrong answers -- all we are interested in is a number that best shows what you think about the XYZ Library service.

		Strongly disagree						Strongly agree
P1.	The XYZ Library has modern equipment.	1	2	3	4	5	6	7
P2.	Physical facilities at the XYZ Library are visually appealing.	1	2	3	4	5	6	7
P3.	Employees of the XYZ Library are neat-appearing.	1	2	3	4	5	6	7
P4.	In the XYZ Library, materials associated with services are clearly written and visually appealing.	1	2	3	4	5	6	7
P5.	The facilities of the XYZ Library are well-organized.	1	2	3	4	5	6	7
P6.	When employees of the XYZ Library promise to do something by a certain time, they do so.	1	2	3	4	5	6	7
P7.	When clients have a problem, the XYZ Library shows a sincere interest in it.	1	2	3	4	5	6	7
P8.	The XYZ Library performs the service correctly the first time.	1	2	3	4	5	6	7
P9.	The XYZ Library provides services during stated hours.	1	2	3	4	5	6	7
P10.	The XYZ Library maintains accurate records, e.g. circulation or catalog records.	1	2	3	4	5	6	7
P11.	Employees of the XYZ Library tell clients exactly when services will be performed.	1	2	3	4	5	6	7
P12.	Employees of the XYZ Library give prompt service to clients.	1	2	3	4	5	6	7
P13.	Employees of the XYZ Library are always willing to help clients.	1	2	3	4	5	6	7
P14.	Employees of the XYZ Library are never too busy to respond to client requests.	1	2	3	4	5	6	7
P15.	In the XYZ Library, clients are always be able to contact an appropriate person.	1	2	3	4	5	6	7
P16.	The XYZ Library provides access to the information the client needs.	1	2	3	4	5	6	7
P17.	The behavior of employees of the XYZ Library instills confidence in clients.	1	2	3	4	5	6	7

	Strongly agree						Strongly disagree
P18. Clients of the XYZ Library feel their transactions are held confidential.	1	2	3	4	5	6	7
P19. Employees of the XYZ Library are consistently courteous with clients.	1	2	3	4	5	6	7
P20. Employees of the XYZ Library have the knowledge to answer client questions.	1	2	3	4	5	6	7
P21. The XYZ Library gives clients individual attention.	1	2	3	4	5	6	7
P22. The XYZ Library has operating hours convenient to all clients.	1	2	3	4	5	6	7
P23. In the XYZ Library employees give clients personal attention.	1	2	3	4	5	6	7
P24. The XYZ Library has the clients' best interests at heart.	1	2	3	4	5	6	7
P25. The employees of the XYZ Library understand the specific needs of their clients.	1	2	3	4	5	6	7
P26. In the XYZ Library, physical access to the services will be convenient for all clients.	1	2	3	4	5	6	7

PERSONAL INFORMATION

Directions: Now, a few questions about yourself and your overall perception of the library's services.

1. How frequently do you use the XYZ Library? (Check the one that best characterizes your use.)

_____ At least once a day
_____ Several times a week
_____ About once a week
_____ Several times a month
_____ About once a month
_____ Several times a year

2. Gender: _____ Female _____ Male

Appendix E. Methods of Computing Summary Scores

Methods of Computing Summary Scores

Note: Much of the text in this appendix is directly quoted from Parasuraman, Zeithaml, and Berry, 1990, pp. 176-177. Difference score is analogous to SERVQUAL score and has been substituted for that in the text. In addition, the text has been divided into sections to allow for reference from the body of the report. Section 1A is new but draws on the others.

The questionnaire items for Modified SERVQUAL, SLA Version (Tested Version) are grouped into the following dimensions for data analysis:

Tangibles	5 items	Items 1-4, 23
Reliability	5 items	Items 5-9
Responsiveness	6 items	Items 10-13, 24, 25
Assurance	4 items	Items 14-17
Empathy	6 items	Items 18-22, 26

For Modified SERVQUAL, SLA Version (Final Version), the questionnaire items from the test version are grouped into the following dimensions for data analysis:

Tangibles	5 items	Items 1-5
Reliability	5 items	Items 6-10
Responsiveness	6 items	Items 11-16
Assurance	4 items	Items 17-20
Empathy	6 items	Items 21-26

Assessing the quality of service using SERVQUAL involves computing the difference between the ratings customers assign to the paired expectation/perception statements. Specifically, a difference score for each statement pair, for each customer, is computed as follows:

Difference score = Perception score - Expectation score

Section 1

A library's quality of service along each of the five dimensions can then be assessed across all customers by averaging their Difference scores on statements making up the dimension. For instance, if N customers responded to the survey, the average Difference score along each dimension is obtained through the following two steps:

1. For each customer, add the Difference scores on the statements pertaining to the dimension and divide the sum by the number of statements making up the dimension.

2. Add the quantity obtained in step 1 across all N customers and divide the total by N.

The Difference scores for the five dimensions obtained in the preceding fashion can themselves be averaged (i.e., summed and divided by five) to obtain an overall measure of service quality. This overall measure is an *unweighted* Difference score because it does not take into account the relative importance that customers attach to the various dimensions.

Section 1A

Follow the steps in Section 1 using the Perception Score or the Expectation Score instead of the Difference Score.

Section 2

An overall *weighted* SERVQUAL score that takes into account the relative importance of the dimensions is obtained as follows:

1. For each customer, compute the average SERVQUAL score for each of the five dimensions (this step is the ame as the first step in the two-step procedure outlined earlier).

2. For each customer, multiply the SERVQUAL score for each dimension (obtained in step 1) by the importance weight assigned by the customer to that dimension (the importance weight is simply the points the customer allocated to the dimension divided by 100).

3. For each customer, add the weighted SERVQUAL scores (obtained in step 2) across all five dimensions to obtain a combined weighted SERVQUAL score.

Section 3

4. Add the scores obtained in Section 2 across all N customers and divide the total by N.

Note: Because of the possibility of "no basis for judgment" responses, dimension scores for the data reported in this project are based on the number of items within the dimensions with ratings of 1 through 7.